

# DETERMINATION OF BISPHENOL A IN WATER USING SYMBIOSIS™ ONLINE SPE HPLC FLD-DAD

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## Introduction

This application note presents a quantitative Symbiosis on-line SPE-LC method with FLD-DAD detection for Bisphenol A in water. The method is based on an enrichment of a water sample on to a Resin GP online SPE cartridge and a chromatographic separation on a C18 analytical column.

Bisphenol A (BPA) is an important industrial chemical that is used primarily to make polycarbonate plastic and epoxy resins, both of which are used in a wide variety of applications. Although the vast majority of BPA is converted at manufacturing sites into products, low-level releases of BPA to the environment are possible.

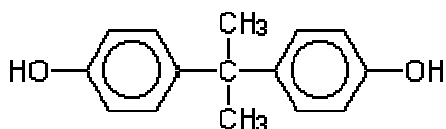


Figure 1 Bisphenol A

- CAS# 80-05-7
- C15H16O2
- Mw 228.29
- Physical Properties:
  - Water solubility 0.120 g/L
  - Log P (Octanol-water) 3.32
  - pKa dissociation constant 10.0

## Experimental

### Instruments

SPE and LC: Symbiosis Generic  
SPE cartridge: Hysphere Resin GP, 10x2 mm (Spark p/n: 0722.610)  
LC-column: Spherisorb ODS 2 C18, 5 µm, 4.6x250 mm (Waters)  
LC-column oven: @ 30°C  
Detector: FLD @ 228 nm excitation, 305 nm Emission .  
DAD @ 230 nm (480 nm ref.)



Figure 2: Symbiosis™ Generic System

### Chemicals

Solvents: Acetonitril (Baker HPLC), Water (Millipore-Q gradient A10)

Analytes: Bisphenol A (Aldrich)

### Calibrations and QC's

The following standard solutions were made:

- 20 ng/L; 40 ng/L; 60 ng/L and 80 ng/L
- Quality control 40 ng/L

### Sample preparation

200 mL water is filtered over a glass filter and collected into a 250 mL flask. The flask is connected to the High Pressure Dispenser (HPD) of the Symbiosis™ System and is ready for processing.

### XLC protocol

The samples are processed with the developed XLC method using the Symbiosis Generic system.

Table 1: XLC protocol.

Cartridge:	10x2 mm HySphere™ Resin GP (Spark Pn:0722.610)	
Solvation:	1 mL ACN	5.0 mL/min
Equilibration:	1 mL 20% ACN	5.0 mL/min
Extraction:	100 mL water sample (using the HPD)	2.5 mL/min
Washing:	2 mL 20% ACN	1.5 mL/min
Elution:	45 min. LC gradient Spherisorb ODS 2 C18, 5 µm, 4.6x250 mm (Waters)	1.0 mL/min
	Min.	(%) ACN in mobile phase
	0	40
	2	40
	22	100
	30	100
	32	40
	40	40
Detection	Agilent FLD-DAD	
	FLD	228 nm excitation, 305 nm emission
	DAD	230 nm (ref. 480 nm)

## Results

### Chromatograms

Figure 3, 4 and are representative chromatograms of respectively the upper (80 ng/L) and lower (5 ng/L) limits of the calibration curve indicating the excellent quantitative suitability of XLC-method. The chromatogram of a blanc sample in figure 5 shows virtually no carry over effects for Bisphenol A.

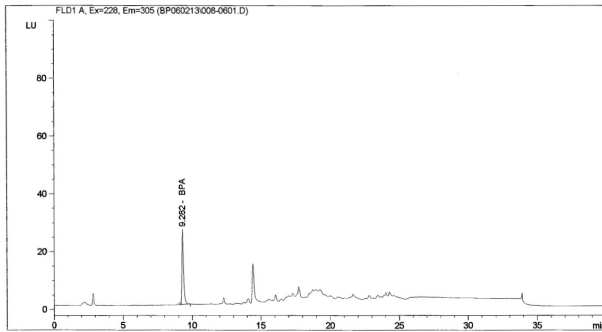


Figure 3: 80 ng/nL standard solution

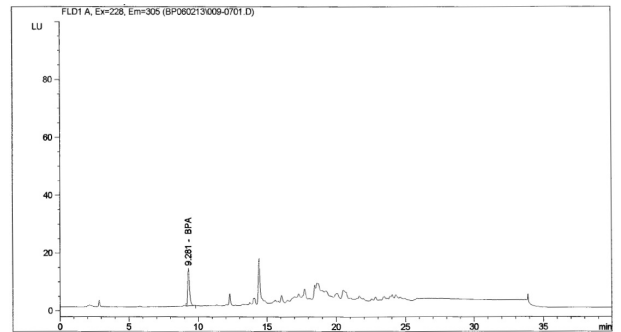


Figure 7: Control sample (40 ng/nL)

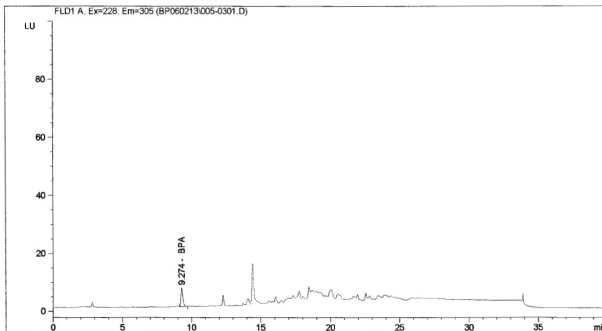


Figure 4: 20 ng/nL standard solution

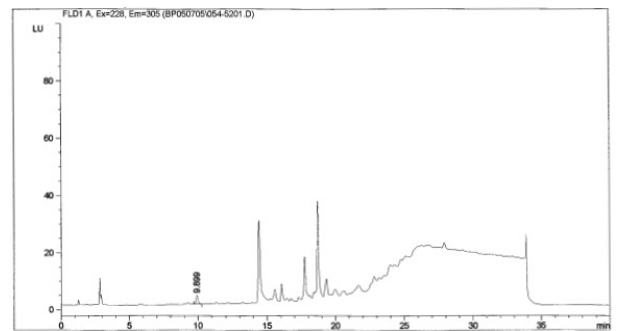


Figure 8: bottled water sample tested negative for Bisphenol A

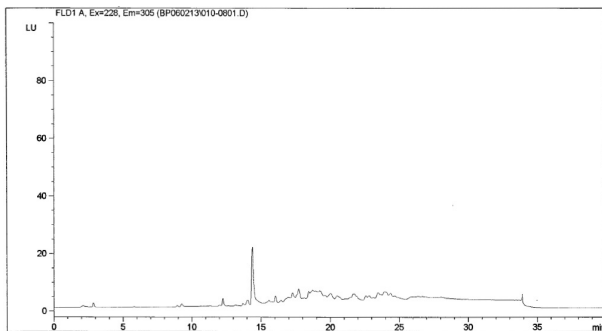


Figure 5: blanc solution

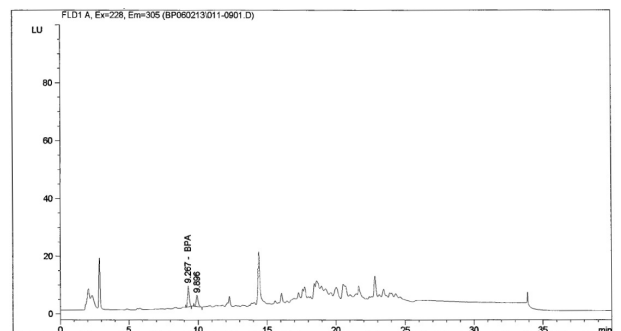


Figure 9: Lake water sample tested positive for Bisphenol A

### Linearity, Accuracy and Precision

A calibration full curve was determined and resulted in a linear regression coefficient of  $R^2=0.9997$ .

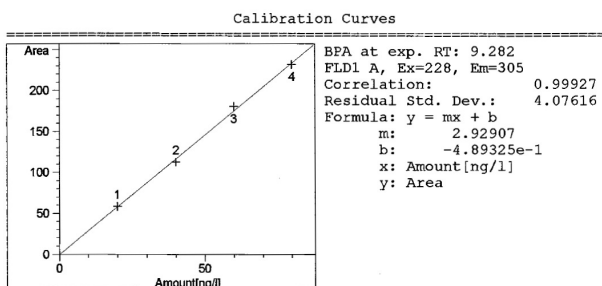


Figure 6: calibration curve

Figure 7 and 8 are representative chromatograms of respectively the Control Sample and a real sample. Demonstrating the usability of the method.

### Conclusions

From this study it is concluded that the developed XLC method had an absolute recovery >90%; a linear range from 5-80 ng/mL ( $R^2$  of 0.9997) with accuracy between 94-106% and a precision of < 15%.

Recovery (%)	LLOQ (ng/L)	ULOQ (ng/L)	Linearity ( $R^2$ )	Precision (%)	Accuracy (%)
95	5	80	0.9997	6	15

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